

## FINANCIAL ANALYSIS

### A. Introduction

1. Financial analysis was conducted to assess the financial viability and sustainability of the project in accordance with relevant Asian Development Bank (ADB) guidelines.<sup>1</sup> The analysis mainly comprises (i) a financial viability assessment of revenue-generating subprojects (Table 1); and (ii) a financial sustainability assessment of (a) the Xiangxi Tujia and Miao Autonomous Prefectural Government (XPG, the executing agency); and (b) the Jishou City Government and the county governments of Baojing, Fenghuang, Guzhang, Huayuan, Longshan, Luxi, and Yongshun (the implementing agencies), which are responsible for the operation and maintenance (O&M) of the project, to assess their financial capacities in covering the recurrent costs of the project.

2. The project has three outputs that comprise 17 subprojects, of which 11 are revenue-generating subprojects and 6 are nonrevenue-generating subprojects (Table 1). They will be implemented by the XPG and the implementing agencies. Financial viability analysis was conducted to assess the viability of the 11 revenue-generating subprojects by comparing their financial internal rates of return (FIRRs) and weighted average costs of capital (WACCs). Financial sustainability analyses were conducted to assess if the XPG and the implementing agencies have adequate financial capacities to cover the incremental recurrent costs, including the O&M expenditures required to ensure sustainability of the project.

**Table 1: List of Subprojects**

Output	Subproject	Revenue-/Nonrevenue-Generating Subproject
Output 1: Rural waste and sanitation management facilities and services improved	1.1. Wastewater management system	Nonrevenue-generating subprojects
	1.2. Solid waste management	
	1.3. Renovation of rural households' unsanitary toilets to sanitary ones	
Output 2: Local-featured ecological agricultural and forestry products developed	2.1. Xiangxi Prefecture Kiwifruit and Citrus Seedlings Research and Breeding Base	Revenue-generating subprojects
	2.2. Baojing County Lvdongshan Gold Tea Industrial Park	
	2.3. Huayuan County Zixia Lake Area Local Special-Featured Agricultural Base	Nonrevenue-generating subprojects
	2.4. Wuling Mountain Area Precious Germplasm Resources Reservation	
Output 3: Value added to local products through value chains and ecotourism	3.1. Integration of forestry with ecotourism along Luxi–Jishou–Fenghuang and Jishou–Huayuan–Zhangjiajie highways	Nonrevenue-generating subprojects
	3.2. Guzhang County Qifeng Lake agricultural and forestry integration with ecotourism	
	3.3. Fenghuang County Shanjiang Village agricultural and forestry integration with ethnic minority-inclusive ecotourism	Revenue-generating subprojects
	3.4. Longshan County Banyue Lake agricultural integration with ethnic minority-inclusive ecotourism	
	3.5. Huayuan County Zixia Lake agricultural and forestry integration with ethnic minority-inclusive ecotourism	
	3.6. Yongshun County Sicheng Village agricultural integration with ethnic minority-inclusive ecotourism	
	3.7. Guzhang County local-featured agricultural products logistics and cold chain base	
	3.8. Yongshun County local-featured agricultural products logistics and cold chain base	
	3.9. Jishou City local-featured agricultural products logistics and cold chain base	
	3.10. Luxi County Xinnv Agricultural Products Trading Center	

Source: Asian Development Bank.

<sup>1</sup> ADB. 2005. *Financial Management and Analysis of Projects*. Manila; and ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila.

## B. Methodology and Assumptions

3. To derive each subproject's FIRR, annual incremental cash flows over each subproject's technical useful life were used. The FIRR was computed on an after-tax basis in real terms. The WACC of each subproject was calculated based on the ratio of debt and equity in financing the total investment cost. Each FIRR was compared with the WACC for the respective subproject. Sensitivity tests were undertaken to test the robustness of the subproject to changes in the underlying parameters: an increase in capital and operating costs, a decrease in revenues, or a lag in subproject benefits.

4. For financial sustainability analyses, the fiscal revenues and expenditures from the last 5 years of the XPG and the implementing agencies were used to analyze their historical financial performance. Based on this, their financial performances were projected over 2021–2028 to assess their capacity to provide counterpart funds, repay debt service, and cover the O&M costs of the subprojects.

5. Technical data and costs obtained from the domestic feasibility study report for the project that the XPG prepared using a design institute were used as the basis of the financial analysis.

6. Key assumptions of the analysis are as follows:

- (i) Physical contingencies were estimated as 5% of base costs.
- (ii) Price contingencies account for cumulative cost inflation during the construction period.
- (iii) Domestic and international cost escalation factors are shown in Table 2.
- (iv) An initial exchange rate of CNY7.0892 = \$1.00 (as of 19 June 2020) was used.
- (v) Financing costs include capitalized interest and commitment fee charges. Interest during construction was computed with 5-year fixed swap rate of 0.461% on 18 June 2020 plus an ADB spread of 0.5% and a maturity premium of 0.2%. The commitment fee is levied against the undisbursed amount of the loan each year. Interest during the repayment period was computed at a 10-year fixed swap rate of 0.798% plus an ADB spread of 0.5% and a maturity premium of 0.2%. Interest rates and terms are shown in Table 3.
- (vi) For purposes of calculating the WACC, the cost of equity was assumed to be 4% based on the recent yield of a 10-year Chinese government bond. The corporate tax rate is 25%. Calculation of the WACC is shown in Table 4.
- (vii) The useful life of each revenue-generating subproject was assumed to be 20 years for the FIRR calculation. The price and tariff of each subproject was based on the details provided in the domestic feasibility study report.

**Table 2: Domestic and International Cost Escalation Factors (%)**

Item	2020	2021	2022	2023	2024	2025	2026	2027
International cost escalation factors <sup>a</sup>	(0.5)	1.6	1.7	1.7	1.8	1.8	1.8	1.8
Domestic cost escalation factors <sup>b</sup>	3.6	1.9	2.2	2.2	2.2	2.2	2.2	2.2

( ) = negative.

<sup>a</sup> World Bank projections as of April 2020.

<sup>b</sup> Asian Development Bank. 2020. *Asian Development Outlook Update 2020 Update: Wellness in Worrying Times*. Manila. Source: Asian Development Bank estimates.

**Table 3: Interest Rates and Terms**

Item	Amount
Interest during construction (IDC) rate (%)	1.161
Commitment fee (%)	0.15
Total period of the loan (years)	25
Interest during repayment period rate (%)	1.398
Grace period (years)	6
IDC and commitment fee capitalized into loan	No

Source: Asian Development Bank estimates.

**Table 4: Estimation of Weighted Average Cost of Capital**

Item	Subproject 2.1			Subproject 2.2			Subproject 2.3		
	ADB	Equity	Total	ADB	Equity	Total	ADB	Equity	Total
A. Amount (CNY million)	23.16	16.28	39.44	77.63	81.63	159.26	72.20	46.68	118.88
B. Weighting (%)	58.73	41.27	100.00	48.74	51.26	100.00	60.73	39.27	100.00
C. Nominal cost (%)	1.50	4.00		1.50	4.00		1.50	4.00	
D. Tax rate (%)	25.00			25.00			25.00		
E. Tax-adjusted nominal cost (%)	1.12	4.00		1.12	4.00		1.12	4.00	
F. Inflation rate (%)	1.65	2.15		1.65	2.15		1.65	2.15	
G. Real cost (%)	(0.52)	1.81		(0.52)	1.81		(0.52)	1.81	
<b>WACC (%)</b>		<b>0.44</b>			<b>0.68</b>			<b>0.40</b>	

  

Item	Subproject 3.3			Subproject 3.4			Subproject 3.5		
	ADB	Equity	Total	ADB	Equity	Total	ADB	Equity	Total
A. Amount (CNY million)	65.44	59.89	125.33	19.30	19.24	38.54	131.46	143.32	274.78
B. Weighting (%)	52.21	47.79	100.00	50.08	49.92	100.00	47.84	52.16	100.00
C. Nominal cost (%)	1.50	4.00		1.50	4.00		1.50	4.00	
D. Tax rate (%)	25.00			25.00			25.00		
E. Tax-adjusted nominal cost (%)	1.12	4.00		1.12	4.00		1.12	4.00	
F. Inflation rate (%)	1.65	2.15		1.65	2.15		1.65	2.15	
G. Real cost (%)	(0.52)	1.81		(0.52)	1.81		(0.52)	1.81	
<b>WACC (%)</b>		<b>0.60</b>			<b>0.64</b>			<b>0.70</b>	

  

Item	Subproject 3.6			Subproject 3.7			Subproject 3.8		
	ADB	Equity	Total	ADB	Equity	Total	ADB	Equity	Total
A. Amount (CNY million)	32.67	32.38	65.06	116.92	59.85	176.77	119.67	43.80	163.47
B. Weighting (%)	50.22	49.78	100.00	66.14	33.86	100.00	73.20	26.80	100.00
C. Nominal cost (%)	1.50	4.00		1.50	4.00		1.50	4.00	
D. Tax rate (%)	25.00			25.00			25.00		
E. Tax-adjusted nominal cost (%)	1.12	4.00		1.12	4.00		1.12	4.00	
F. Inflation rate (%)	1.65	2.15		1.65	2.15		1.65	2.15	
G. Real cost (%)	(0.52)	1.81		(0.52)	1.81		(0.52)	1.81	
<b>WACC (%)</b>		<b>0.64</b>			<b>0.27</b>			<b>0.11</b>	

  

Item	Subproject 3.9			Subproject 3.10		
	ADB	Equity	Total	ADB	Equity	Total
A. Amount (CNY million)	79.86	40.00	119.85	97.63	78.68	176.31
B. Weighting (%)	66.63	33.37	100.00	55.38	44.62	100.00
C. Nominal cost (%)	1.50	4.00		1.50	4.00	
D. Tax rate (%)	25.00			25.00		
E. Tax-adjusted nominal cost (%)	1.12	4.00		1.12	4.00	
F. Inflation rate (%)	1.65	2.15		1.65	2.15	
G. Real cost (%)	(0.52)	1.81		(0.52)	1.81	
<b>WACC (%)</b>		<b>0.26</b>			<b>0.52</b>	

Note: Numbers may not sum precisely because of rounding.

( ) = negative, ADB = Asian Development Bank, CNY = Chinese yuan, WACC = weighted average cost of capital.  
Source: ADB estimates.

### C. Financial Viability Analysis

7. Financial viability analysis was carried out for the 11 revenue-generating subprojects whose revenues will mainly come from sales revenues of fruit, tea, oil-tea camellia, processed agricultural products and seedlings, rental income, and tourism income. The O&M costs will mainly include the costs of materials, fuel and power, staff salaries and welfare, maintenance and repair, and administration.

8. The financial viability analysis of the revenue-generating subprojects indicates FIRRs ranging from  $-7.28\%$  to  $4.35\%$ , of which nine subprojects (2.1, 2.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.9, and 3.10) have higher FIRRs than their WACCs. Sensitivity analysis shows that these nine subprojects are financially viable under the following adverse scenarios: (i) 10% capital cost increase, (ii) 10% operating cost increase, (iii) 10% revenue decrease, and (iv) 1-year benefit lag. However, subprojects 2.2 and 3.6 are not financially viable under the following scenarios: 10% operating cost increase and 10% revenue decrease. The results of the sensitivity tests are summarized in Table 5.

**Table 5: Financial Analysis and Sensitivity Tests**

Subproject	Indicator	Base Case	10% Capital	10%	10%	1-Year	WACC
			Cost Increase	Operating Cost Increase	Revenue Decrease	Benefit Lag	
2.1	FIRR (%)	2.82	1.96	1.84	0.97	2.36	0.44
	FNPV (CNY million)	12.23	8.32	7.06	2.62	10.26	
2.2	FIRR (%)	2.23	1.81	(0.68)	(1.08)	1.86	0.68
	FNPV (CNY million)	63.54	47.88	(53.09)	(67.06)	47.63	
2.3	FIRR (%)	(7.28)	(7.70)	(7.87)	(7.89)	(7.29)	0.40
	FNPV (CNY million)	(96.65)	(108.40)	(102.30)	(102.40)	(96.35)	
3.3	FIRR (%)	3.00	2.15	2.50	1.50	2.53	0.60
	FNPV (CNY million)	39.46	27.10	33.95	17.13	36.19	
3.4	FIRR (%)	2.19	1.33	1.88	1.47	1.77	0.64
	FNPV (CNY million)	8.34	4.53	6.80	4.83	6.58	
3.5	FIRR (%)	4.12	3.20	3.77	2.66	3.55	0.70
	FNPV (CNY million)	122.86	95.84	109.55	68.33	106.89	
3.6	FIRR (%)	1.73	0.95	0.52	(0.36)	1.36	0.64
	FNPV (CNY million)	9.12	2.72	(0.97)	(8.09)	6.24	
3.7	FIRR (%)	3.91	2.87	3.08	1.75	3.27	0.27
	FNPV (CNY million)	74.47	56.91	56.60	28.89	64.73	
3.8	FIRR (%)	4.35	3.27	3.70	2.32	3.66	0.11
	FNPV (CNY million)	80.81	64.50	67.70	40.60	71.59	
3.9	FIRR (%)	(0.63)	(1.31)	(1.56)	(1.78)	(0.85)	0.27
	FNPV (CNY million)	(13.49)	(25.38)	(27.31)	(30.56)	(17.19)	
3.10	FIRR (%)	1.43	0.95	0.80	0.58	1.01	0.52
	FNPV (CNY million)	17.14	8.43	5.26	1.16	9.53	

( ) = negative, CNY = Chinese yuan, FIRR = financial internal rate of return, FNPV = financial net present value, WACC = weighted average cost of capital.

Source: Asian Development Bank estimates.

9. The other two subprojects (2.3 and 3.9) have negative FIRRs, indicating the subprojects cannot recover their full costs. However, their full recovery of the O&M costs can be achieved from the generated revenue. The decision to invest in these two subprojects is based on the high social economic benefits, with an economic internal rate of return of  $12.3\%$  for subproject 2.3 and an economic internal rate of return of  $13.6\%$  for subproject 3.9.

#### D. Financial Sustainability Analysis

10. Financial sustainability analysis was carried out to assess the fiscal capacity of the XPG to repay debt service for the whole project, and the fiscal capacities of the XPG and the implementing agencies to cover the O&M costs of their respective subprojects and ensure overall project sustainability. A review of the historical revenues and expenditures of the XPG and the implementing agencies was undertaken. Projections were prepared to assess the likely financial performance of the XPG and the implementing agencies during the project

implementation and operation periods. The historical and projected fiscal analyses of the XPG and the implementing agencies are provided in the Annexes to Financial Analysis.<sup>2</sup>

11. Revenues of the XPG and the implementing agencies are from taxes (such as value-added tax, business tax, resource tax, and real property tax); nontax revenues; and grants from the higher authorities such as the central and provincial governments. Expenditures are general budget expenditures such as expenditures on general public services, education, public safety, personnel welfare, environmental protection, agriculture, forestry, and water. The historical revenue and expenditure statements of the XPG and the implementing agencies demonstrate that their revenues largely depend on the subsidies from the central and/or provincial governments. Given that the Xiangxi Tujia and Miao Autonomous Prefecture is a poor region in Hunan Province, subsidies from the central and/or provincial governments to both the XPG and the implementing agencies will continue for them to the expenditure requirements.

12. Revenues and expenditures of the XPG and the implementing agencies were projected to assess each of their financial capacities to cover recurrent expenditures, including debt services and recurrent costs for the O&M of the project. The projections were prepared based on the historical revenues and expenditures of the XPG and the implementing agencies with the incremental costs associated with the project. The projected financial positions of the XPG and the implementing agencies confirm each of their financial capacities to cover the recurrent costs of the project that will sustain the facilities. In addition, given the central government's support for the project, adequate budgetary allocations from the central and/or provincial governments to the XPG and the implementing agencies can be reasonably expected. Relevant covenants are also included in the loan and project agreements to ensure the financial sustainability of the project.

## **E. Conclusion**

13. According to the financial analysis, (i) nine revenue-generating subprojects are financially viable; (ii) two revenue-generating subprojects cannot cover the full cost, although full recovery of the O&M costs can be achieved from the generated revenue; (iii) the XPG and the implementing agencies will each have adequate financial capacity to cover the recurrent costs of the project and ensure the project's financial sustainability.

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<sup>2</sup> Annexes to Financial Analysis (accessible from the list of linked documents in Appendix 2 of the report and recommendation of the President).